On Programming Art Employing Electrical Circuit

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This paper is a guide against for method of Programming Art. I settled the problem to make up Gate which refuses any one comes in to my atelier, as every one can master the method of Programming Art mainly electrical circuits. 13 classes are employed to establish fundamental story as shown in the below contents. Here, I will give special thanks for Mr. Walter (USA) checking & discussing against for this paper.

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[*01 class*]

I made gate has chain lock. This locking is simplest one, and I want to cache the behavior when someone tries to break the gate. Then I designed the gate to call for the policeman. When I go to out, the chain is to be connected, after setting I tell the policeman as I no-exist from now. From this time the gate is working as protector of my atelier. This circuit has the possibility to connect the internet by use of dsPIC. This part is hard to use but very useful. To master dsPIC, many technical terms should be put in to your memory, therefore I set up a game like memorizing method which is get from Mr. Walter.

Please connect between list-up words in left side and right side with the arrays.

(a) Logic circuit depended on TTL	(1) Measurement of Behavior of gates
(b) Timing Chart	(2) This circuit is deferent from analog one
(c) Logic Analyzer	(3) Inverter
(d) Digital Oscilloscope	(4) Soft-ware of TTL
(e) SN74LS04	(5) This is used both digital and analog
(f) SN74LS08	(6) D-F/F
(g) SN74LS74	(7) AND gate

MEMO ----------

[*02 class*]

In 01 class I showed circuit of gate control and timing chart (but which are not list up in this paper). I want to continue this story also this class. Now, from (a) to (e) are shapes of parts. Please recognize here. Out-put of gate control circuit can be connected for internet using dsPIC. And the behavior of intruder can be checked by Web Camera. Then I have a plan to show more details dsPIC in next class.

Please make combination pares as [*01 class*].

(a) Outlooks of Parts as TTL, FET and Relay.	(1) Electrical connection between parts
(b) Socket	(2) Packing of parts
(c) Base Plate	(3) 16bit
(d) Rapping-wire	(4) All parts are contacted on this
(e) Case	(5) In TTL ordinary 14pin
(f) Using Internet	(6) Through Hole
(g) Web Camera	(7) Connect to PC by USB
(h) USB	(8) This circuit has possibility of developing to WEB
(i) dsPIC	(9) Serial Bus

MEMO----------

[*03 class*]

In directly to describe the character of dsPIC is too diffcult, then I decide to introduce the 8bit PIC using the book titled below.

"MAKING PIC MICROCONTROLLER"
-INSTRUMENTS & CONTROLERS-
Harprit Singh Sandhu

In today's class, many books are employed. I think basically knowledge are come from TTL, so we must start to get the information of characteristics like a counter, resister, memory and etc.

Please search meaning of list up words from Sandhu's book.

(a) PIC 16F877A
(b) PIC16F877A-I/P
(c) RISC CPU
(d) FLASH
(e) RAM
(f) EEPROM
(g) POR
(h) PWRT
(i) WDT
(j) SLEEP
(k) CMOS FLASH/EEPROM
(l) ICSP
(m) PWM
(n) SSP
(o) USART
(p) PSP
(q) BOR
(r) LAB-X1

MEMO----------

[04 class]

I will explain the details of clock circuit, counters, timing-pulse generator and censers using white bode.

MEMO----------

[*05 class*]

Please lock delivered off prints which show the functions of dsPIC. In dsPIC30F4013, A/D 12bit 200ksps; functionally 13ch analog to digital converters are assumed to be contained in one package, but only one A/D converter is contained in hard wear existence. When We use this function, the output of devices of any censer like an infrared censer, or output of the OPamps are connected to the analog ports of dsPIC, analog signals will be gathered in PC memory easily. Here I show the possibility only, please search the books which describe details.

MEMO----------

[*06 class*]

Serial communication system is better characteristics rather than parallel communication system. Because communication wire's number is less in serial. We can use four kinds of serial communication systems employing dsPIC. UART, SPI, IIC and CAN are beery interesting. Therefore please get the techniques of an employing.

MEMO----------

[*07 class*]

If you want to get the designed parts, you should be recognize that the market in Akihabara can not respond soon. Therefore you decide the changing of the your designed circuits when the un-possibility come from. If you want to meet thus condition, you should design some circuits and go to the market. In this class, I will show the designed circuits of the gate and try to get parts. And the results, I will tell you that I can not get it all. The market shows me there are many ways to construct the same function. Also you will find it as me.

MEMO----------

[*08 class*]

The market has many kinds of kit package which is more cheape than the getting parts by your self. Because,those are prepared for the professional. Then you should find out the kit packages in the market. In this class I will introduce many kit packages for you.

MEMO----------

[*09 class*]

From [*01 class*] to [*08 class*] , my thought is based on the hypothesis of behavior of coming humans. And checking systems are abnormal, according to my present stance, so I want to return first step to check the movement of gate getting outer power. The design is purposed to fit to the coming human's behavior. The comers have a very nice impression to meet my mother , so they comes without pushing key which is the coming sine for the mother. I think to check the open angle of the gate is good by the A/D converter. So I develop the design from how to get the information of the angle of the gate by any censer, and how to input to the dsPIC. I want to show it's hard and soft of dsPIC in this class.

Potentiometer is useful to transfer from mechanical movement to electrical movement. The gate move between zero deg and 90 deg. We can get tow types potentiometer, circle type and strait type. Now I will set a no-real-story that already these mechanicals are completed, and I can get the angle information electrically. Next step we have to design interface between electrical signal of potentiometer and dsPIC. To make clear this problem. I think to search the structure of input sysem of analog signal in dsPIC. To search inside of dsPIC structure is very difficult for the beginner, so we start to get a analogy list up in any books or magazines.

MEMO----------

[*10 class*]

In last class, by the analogical method we studied how to design dsPIC and PC system from hardware to software. Another-hand, I will start to design Open Angle Measurement System of the gate (OAMS/G). To complete this, I use self Q&A sentences as in below.

[Q01] I want to set on base panel a circle type potentiometer as a censer of the open angle. The potentiometer has three terminals, I know the signal read out from middle arranged terminal changes according to mechanical movements of the circle-cut like material positioned in hole of the potentiometer. Of cause voltage should be added in this case. But here, the matching between mechanical movement and addition voltage polarity and value is important. How to check the relationship?

[A01] Addition voltage will be decided with the accept-range of dsPIC's analog inputs. Please recheck analog input characteristics. And also check next things. In case of using the analog input system in dsPIC, plus/minus 15 Volts should be added or not. When I check the relationships between mechanical movements and voltage change values, I use digital synchronic scope almost.

[Q02] I want to set the relation that when the gate is closed the signal comes from potentiometer is 0 Volt, and when the gate is 90 degree the signal is 5 Volt How using condition is optimal for the analog input of dsPIC, and what kinds of OPamps is suitable to make matching between potentiometer and analog input of dsPIC. Simply, SN741 is OK? Or another OPamps are should be used?

[A02] The information of correspondences against for Q02 is got by the data sheet which is published as "2006 Microchip Technology Inc." V_{DD} and V_{SS} are digital system power

supply, and AVDD and AVSS are analog system power supply. VDD and AVDD are should be added about 5 Volt, and Vss and AVss are connected to GND. These results mean that dsPIC is operated by only one power supply. Then SN741 is not suitable for the interface OP amp. Because, SN741 is two power supply (=+15, -15 Volt). If the potentiometer is added 5 Volt, the OP amp will be not need.

[Q03] I want to send an interrupt signal for the dsPIC when the voltage value is lager than 0 Volt, and let to start the A/D conversion. How to check over condition rather than 0 Volt, how to interrupt to the dsPIC.

[A03] I think these anthers are get from the User's Manual published by Microchips. Therefore I will check this now. I try to effort to let this checking is the method of this like manual as soon as you can understand. Then I through out from Q&A sentences system, and I focus to reading this User's manual.

MEMO----------

[*11 class*]

The User's Manual is composed with four chapters, interrupt & A/D is described in the chapter 4. I am thinking if you have some idea of using dsPIC, you should read the chapter 4 in the first. The results of more fine my searching in chapter 4, I find out A/D, interrupts, ISP, Flash Compact Memory card, SD card, and others are important. The descriptions against for ISP are many more than I2C, which was not in my knowledge. And Flash Compact Memory card and SD card are available as an outside memory of dsPIC, which was also I don't know. Because of I got above results, next step I think you should read out chapter 1, 2, and 3, but those are not many contents.

MEMO----------

[*12 class*]

I want make up the hard ware of Gate moving checker, infrared censer, ultrasound censer, web camera, and important device dsPIC. I already made the hard wears of infrared censer and ultrasound censer systems, then I will show you these in today's class. And I tried to check the contents of Visual Basic 2008 Express. The purpose of checking this book is how design against for that; when UART is worked with any interrupt, and A/D converter's data are assumed to be transferred to the PC. Here the data are stored in which memory, and I want know how to call the data from the memory. With the soft wear: Visual basic 2008 Express, the tasks to call the data from the memory and to represent for monitor of PC are can be executed easily or not. I think more detailed check to the UART function in the treatment of data transferred for PC, and also need to check more detailed as described in above sentence, by the focusing the Language Function. Now I have to read out this book as fast as I can. I will prepare to speak the reading results for you as you become satisfaction like condition. Other wide, I am haranguing to make up the hard wear of dsPIC, mainly A/D converter which is work with any interrupt signal. But the parts of USB connecter and Run socket are not stocked in my laboratory. If these parts are got soon, I can make out and I can show you next class. And I have a plan to add the WEB CAMERA for the PC. If I can add this, I will show you.

MEMO----------

[*13 class*]

My class is meeting for the END with today's lesson. My hope is showing the system of hard & soft against for the Anti Robber System of my research center. Thus sentences were wrote in 11 class, I supposed that DSP function is important to disrobe the problem which was discussed in 12 class as what soft wear linkage between dsPIC's C language and Visual Basic 2008 Extended are can be executed. So I want to analyze against for DSP function more fine today. According to the book describing for DSP, this word has meaning of digital signal processor, which works as an engine named "DSP engine". This is composed with accumulator and multiplier mainly. These have commands as MAC, MSC, MPY, MPYN, ED, and EDAC. If the output signal of A/D conversion is transferred for the DSP, and the results are modified as to be usable for the UART, the possibility of PC side get the signal to be used on the soft of Visual Basic 2008 Extended. I have to check the estimation is true or not. So I will employ the analogy listed in the other books, please search the books your self. But there is the anti estimation like that; A/D conversion signal is easily treated as usable for URAT. Both estimations should be checked. I show the summarizing of dsPIC's words in the below.

1) Interrupt from the outside circuit of dsPIC
   INT0, INT1, INT2, INT3, INT4
2) A/D commands
   Busy ADC12, CloseADC12, ConfiglintADC12, CovertADC12, OpenADC12, ReadADC12, StopSampADC12, SetChanADC12, EnableIntADC, DisableIntADC, SetPriorityIntADC
3) Interrupt from A/D converter inside of dsPIC
   _ADCinterrupt
   (this shows completing condition of A/D conversion)
4) DSP commands
   MAC a=a+b*c or a=a+b*b
   MSC a=a-b*c

MPY a=b*c
MPY.N a=-b*c
ED a=(b-c)*(b-c)
EDAC a=a+(b-c)*(b-c)

5) Accumulator condition indicator inside of DSP engine
   OA, OB, OAB, SA, SB, SAB
6) Interrupt commands for UART
   _U1RXInterrupt, _U1TXInterrupt,_2RXInterrupt,
   _U2TXInterrupt
7) Interrupt commands for SPI
   _SPI1Interrupt, _SPI2Interrupt

Now I enclose my introducing the dsPIC as a very usable device for our Programming Art. Good By!

MEMO----------